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LENGTH WEIGHT RELATIONSHIP OF WHIP FIN SILVER BIDDY *GERRES FILAMENTOSUS* (CUVIER) FROM SHARAVATHI ESTUARY, CENTRAL WEST COAST OF INDIA

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Abstract

The length weight relationship and relative condition factors were studied between Jan. and Dec. 2008. Length weight relationship of *Gerres filamentosus* did not differ significantly between the sexes and combined equation is given by $W= 0.000001663\ L^{3.1675}$. The highest Kn value in female was in June (1.0950) and lowest in July (1.0950). Similarly the highest Kn value in male was in Dec (1.0587) and lowest in July (0.8994). Both in males and females the Kn value was highest in the size of 101-110 mm which can be attributed to feeding.

Keywords: Length weight relationship, *Gerres filamentosus*, sharavathi estuary

Introduction

Family Gerreidae include small to medium sized fishes all below 35cm in total length distributed shallow coastal waters of all warm seas. The present paper attempts to provide information on the Length weight relationship and relative condition factors of *Gerres filamentosus* from sharavathi estuary, central west coast of India.

Materials and Methods

The study was carried out between Jan and Dec 2008 based on fortnightly samples obtained from sharavathi estuary. A total of 2582 specimens (969 males, 1292 females and 321 indeterminate) were used. In the laboratory the total length (mm) and weight (gm) were noted. The data comprised all the available sizes represents the commercial catches along the sharavati coasts (Table 1, Table 2 & Table 3).

The length – weight relationship of *Gerres filamentosus* was calculated by using the formula $W=aL^b$ which is logarithmically transformed into log W= log a + b log L where 'W' is the weight of the fish 'L' is the length of the fish and a and b are constants. Analysis of covariance (Snedecor and Cochron, 1967) was used to test significant difference in the estimates of b between the sexes. The pattern of growth was tested by t-test using the formula t = b-3/sb. The relative condition factor Kn was calculated for individual fish by using the formula Kn=W/w where 'W' is the observed weight and' w' is the calculated weight.

Table 1. Length-weight data of *Gerres filamentosus* (indeterminates)

Length group (mm)	Number of observations	Average length (mm)	Average weight (gm)	Calculated Y	W
51-60	40	58.0	2.25	0.3829	2.41
61-70	75	64.87	3.34	0.5192	3.30
71-80	86	75.42	4.99	0.7038	5.05
81-90	72	85.36	6.79	0.8556	7.17
91-100	48	98.00	12.00	1.0246	10.53

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Table 2. Length-weight data of *Gerres filamentosus* (males)

LENGTH GROUP	TOTAL NO. OF OBSERVATIONS	AVERAGE TOTAL LENGTH (mm)	AVERAGE WEIGHT (gm)	CALCULATED Y	W
101-110	60	104.33	17.60	1.1967	15.73
111-120	75	112.15	18.50	1.2967	19.80
121-130	81	125.55	24.73	1.4519	28.31
131-140	53	132.50	30.33	1.5253	32.75
141-150	48	147.00	38.48	1.6681	46.57
151-161	102	154.66	58.34	1.7384	54.75
161-170	115	168.50	64.48	1.8583	72.16
171-180	104	174.66	74.06	1.9051	80.37
181-190	93	186.50	87.85	1.9949	98.83
191-200	72	195.28	109.50	2.0587	114.50
201-210	38	205.00	126.33	2.1255	133.60
211-220	42	216.00	171.62	2.1974	157.50
221-230	54	227.60	184.00	2.2692	185.90
231-240	32	236.00	191.48	2.3198	208.40

Table 3. Length - weight data of *Gerres filamentosus* (females)

LENGTH GROUP (mm)	NUMBER OF OBSERVATIONS	AVERAGE TOTAL LENGTH (mm)	AVERAGE WEIGHT (gm)	CALCUTATED Y	W
101-110	50	105.66	18.62	1.2352	17.19
111-120	78	115.50	19.55	1.3508	22.43
121-130	65	125.50	24.73	1.4588	28.76
131-140	112	136.25	40.07	1.5684	37.01
141-150	102	147.33	46.67	1.6677	46.52
151-160	108	154.66	59.03	1.7317	53.92
161-170	69	167.33	62.37	1.8337	68.19
171-180	95	176.00	64.48	1.8998	79.39
181-190	93	184.66	105.33	1.9625	91.73
191-200	86	196.25	110.48	2.0423	110.40
201-210	72	206.00	127.33	2.104	121.70
211-220	114	215.00	170.60	2.1606	144.70
221-230	45	228.00	185.62	2.2372	172.70
231-240	59	235.00	190.75	2.2768	189.10
241-250	72	247.00	206.00	2.3416	219.60
251-260	32	254.00	245.00	2.3779	238.70
261-270	30	267.00	280.00	2.4437	277.40
271-280	10	278.00	300.00	2.4956	313.00

Table 4. Analysis of covariance for comparison of length weight relationship of males and females in *G. filamentosus*

	Source of Variation	No.	Reg. Coeff.	D. F.	Deviation from regression SS	MS	F- Ratio
	Within males	14	3.0017	13	0.0165	0.0012699	
	Within females	18	3.1657	17	0.0279	0.001641	
	Deviation from indivisual regression Within sexes			30	0.0444	0.001480	0.0015
		32	3.06766	31	0.0459	0.001480	0.00148
Pooled data	Difference between the slopes			1	0.0015	0.0015	=1.0135

Results and Discussion

Length- Weight relationship

The length weight relationship of *Gerres filamentosus* was estimated as

W= 0.000001559L $^{3.1657}$ (males)

W= 0.00006926L $^{3.0017}$ (females)

W=0.00003931L $^{2.8220}$ (indeterminates)

The regression equation of males and females did not differ significantly and a common equation was calculated as W=0.00001663L $^{3.1675}$

In the present study the length- weight relationship of *Gerres filamentosus* showed that the weight of the fish increased almost at the cube of length as the value of exponential was found to be 3.1675. This was found to be not significantly different from the hypothetical 3.00 of an ideal fish.

While discussing the merits of allometric formula in contrast to cube formula in expressing the length – weight relationship , Beaverton and Holt (1957) stated that the values of a and b may vary within the wide limits for very similar data and instance of important deviations from isometric growth in adult fishes are rare.

From the above results it is obvious that growth does not depart significantly from the isometric growth of *Gerres filamentosus* .The length weight relationship of *Gerres filamentosus* showed an isometric form of growth as expressed by the common regression equation ,

Log W = -5.2209+3.16750Log L

The analysis of covariance (Table 4) shows that there is no significant difference (F=1.0135) in the length weight relationship between males and females. Hence a common relationship irrespective of sex is obtained.

The corresponding parabolic equation was represented by

W=0.000001663L $^{3.1675}$

Hence cubic formula $W=CL^3$ can well represent the length weight relationship in this species.

Relative condition Factor

The condition factor expresses the general wellbeing of the fish. It also gives clues regarding food supply, timing and duration of the breeding cycle. In females Kn values were higher than the average weight (1.0129) in January, April, May, June, November, and December 2008. The values of Kn lower than the average weight in February, March, July, August, September and October 2008. The higher Kn values in female was in June (1.0950) and lowest in July (Table 6).

In males the Kn values were higher than the average weight (0.9905) during January, March, May, June and from October to December 2008.The highest Kn values were in December (1.0587) and lowest in July (0.8994) (Table 6).

The present study on the seasonal variation in the condition of males and females showed that the Kn values were more or less similar in both the sexes, thus indicating almost equal metabolic activity. The values of males were noted in November and December which may be related to feeding activity and post –spawning recovery of the fish. The higher Kn values registered for females from April to June almost coincide with the months of occurrence of higher values of Gonado Somatic Index. While the months with lower Kn values were similar to those with lower Gonado Somatic Index. There seems to be some relation between condition and feeding habits. October, November, December and January were periods of intensive feeding when the condition values were also high in both the sexes.

Relative condition Factor in Relation to size of Fish

Fluctuation in the relative condition with the length of fish is not regular. The values of Kn was highest in the size range of 101-110 mm. Further there was gradual decrease in Kn values till 141-150mm. Again the Kn values attained a peak in the next size group151- 160mm which might be due to the building up of gonads and sudden fall in the size group of 161-170 mm could be due to the spawning stress on the fish which is very close to 50%attainment of maturity length at 158 mm. The values shows peaks at 171-180mm, 191-200mm and 211-220mm and troughs at 181-190 mm201-210mmand 231-240 mm This may be associated with subsequent maturation and spawning cycle (Table-5).

The Kn values for females showed that the size groups of 101-110mm exhibited high Kn follo wed by sudden decrease in the next successive size groups of 111-120mm and 121-130mm. There was gradual increase in the Kn values till 151-160mm after which it falls in 161-170mm size groups only to rise in the size class of 181-190mm. The highest values in151 to 160 mm might be due to the accumulation of fat prior to spawning, building up of gonads and drop in the 161-170 mm and 171-180 mm size groups could be due to the spawning activity of the fish. It has been observed that 50%of females mature at 161 mm which is closer to 161-170 mm at which condition showed a fall. Females showed high values at 181-190 mm, 211-220 mm and 251-260mm and low values at 191-200 mm, 241-250 mm and 271-280 mm (Table 5). These peaks and troughs in the large size groups might be related to later maturation and breeding cycle of the species.

Table 6 a . Mean values of relative condition factor of *Gerres filamentosus* from Jan. 2008- Dec. 2009

Months	Kn		Months	Kn	
2008	Males	Females	2009	Males	Females
January	0.9912	1.0176	January	0.9987	1.0080
February	0.9760	0.9909	February	1.0120	0.9926
March	1.0402	0.9983	March	0.9967	1.0420
April	0.9847	1.0908	April	1.0012	1.0124
May	1.0022	1.0442	May	1.0024	1.0726
June	0.9954	1.0950	June	1.0750	1. 0842
July	0.8994	0.9070	July	0.8815	0.8941
August	0.9264	0.9074	August	0.9130	0.9045
September	0.9675	0.9505	September	0.9943	0.9857
October	1. 0121	1.0025	October	1.0610	1.0720
November	1.0324	1.0713	November	1.0826	1.0900
December	1.0587	1.0796	December	1.0504	1.0840

Table 6 b . Average Weight for The year

2008	Kn		2009	Kn	
	Males	Females		Males	Females
Average Weight for The year	0.9905	1.0129	Average Weight for The year	1.0057	1.0201

Table 5. Mean values of relative condition factor for *Gerres filamentosus* in different size group

Size groups(mm)	Kn	
	Males	Females
101-110	1.1188	1.0402
111-120	0.9343	0.8716
121-300	0.8735	0.8598
131-140	0.9265	1.0826
141-150	0.8262	0.9989
151-161	1.0655	1.1096
161-170	0.8935	0.9146
171-180	0.9214	0.8121
181-190	0.8889	1.1482
191-200	0.9563	1.0007
201-210	0.9455	1.0462
211-220	1.0896	1.1789
221-230	0.9945	1.0748
231-240	0.9188	1.0087
241-250	-	0.9380
251-260	-	1.0263
261-270	-	1.0093
271-280	-	0.9390

Hence, based on the results obtained during the present study it can be concluded that the variation in the condition of *Gerres filamentosus* may be related to sexual cycle or feeding intensity and perhaps to several other unknown factors.

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